Programmes After Market Services
NSB-5 Series Transceivers

Troubleshooting Instructions

Issue 1 03/01
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Troubleshooting

The following hints should facilitate finding the cause of the problem when the circuitry seems to be faulty. This troubleshooting instruction guide is divided into the following sections:

1 Phone is totally dead

2 Flash programming doesn't work

3 Power doesn't stay on or the phone is jammed

4 Display information: Contact Service

5 Phone doesn't register to the network or phone doesn't make a call

6 Plug in SIM card is out of order (insert SIM card or card rejected)

7 Audio fault

8 Charging fault

The first step to do is to carry out a thorough visual check of the module. Ensure in particular that:

- there are not any mechanical damages, and
- solder joints are okay.

Phone is Totally Dead

This means that the phone doesn't take current at all when the power switch is pressed (X400 pin 7) or when the watchdog disable pin is grounded. Used battery voltage must be higher than 3.1V. Otherwise, the hardware of CCONT (N100) totally prevents power from switching on.

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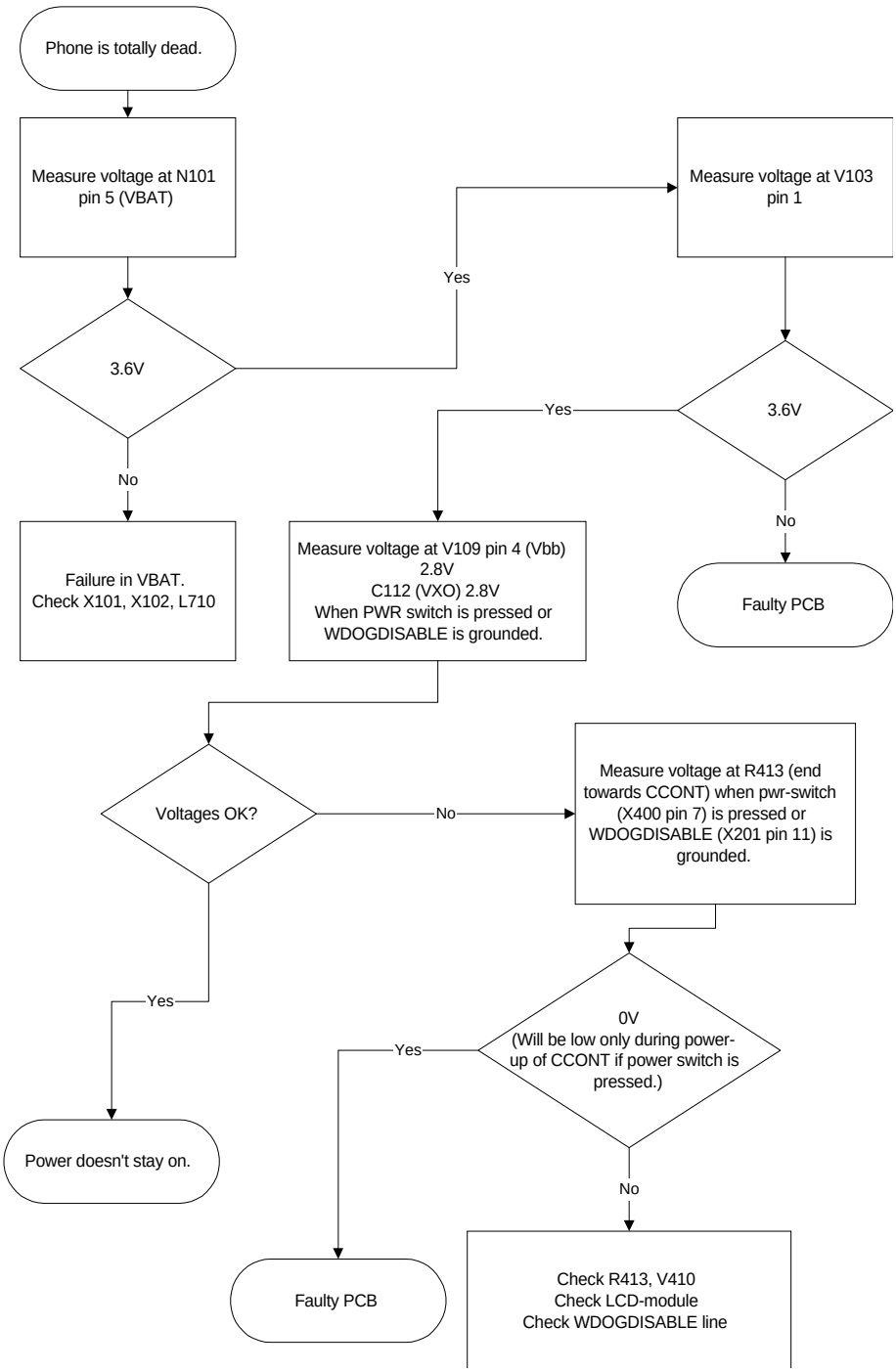
Phone is totally dead.
Measure voltage at N101 pin 5 (VBAT)
3.6V
Yes
No
Failure in VBAT. Check X101, X102, L710
Measure voltage at V103 pin 1
3.6V
Yes
No
Faulty PCB
Measure voltage at V109 pin 4 (Vbb) 2.8V
C112 (VXO) 2.8V
When PWR switch is pressed or WDOGDISABLE is grounded.
Voltages OK?
No
Yes
Power doesn't stay on.
Measure voltage at R413 (end towards CCONT) when pwr-switch (X400 pin 7) is pressed or WDOGDISABLE (X201 pin 11) is grounded.
0V
(Will be low only during power-up of CCONT if power switch is pressed.)
Yes
No
Faulty PCB
Check R413, V410
Check LCD-module
Check WDOGDISABLE line

Figure 1: Fault Finding for Totally Dead Phone

Flash Programming Doesn't Work

The flash programming can be done via panel connector X201 or via system connector X200.

In production, the first programming is done via panel connector X201. After this, the panel connector is cut away, thus other flash programming must be done via system connector X200.

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The main differences between these are:

- FLASH programming voltage (Vpp) is produced a different way, and
- Signal routings are different.

The fault-finding diagrams for flash programming are shown in Figure 2, Figure 3, and Figure 4.

In cases of flash programming errors, the flash prommer can provide some information about a fault. The fault information messages could be:

- MCU doesn’t boot
- Serial clock line failure
- Serial data line failure
- External RAM fault
- Algorithm file or alias ID don’t find
- MCU flash Vpp error

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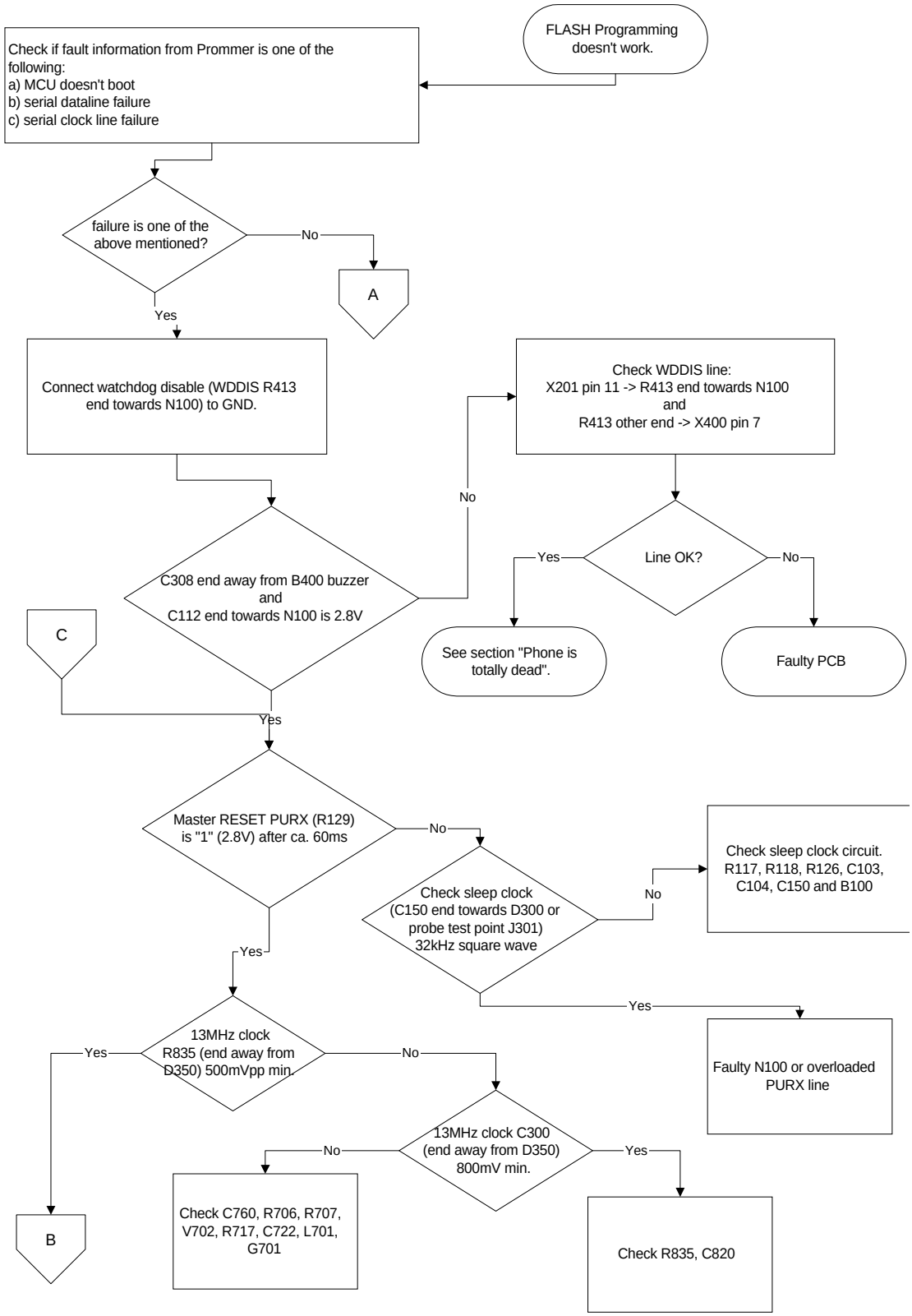
FLASH Programming doesn't work.
Check if fault information from Prommer is one of the following:
a) MCU doesn't boot
b) serial dataline failure
c) serial clock line failure
failure is one of the above mentioned?
No
A
Yes
Connect watchdog disable (WDDIS R413 end towards N100) to GND.
Check WDDIS line:
X201 pin 11 -> R413 end towards N100
and
R413 other end -> X400 pin 7
No
C308 end away from B400 buzzer
and
C112 end towards N100 is 2.8V
Yes
Line OK?
No
Yes
See section "Phone is totally dead".
Faulty PCB
C
Yes
Master RESET PURX (R129) is "1" (2.8V) after ca. 60ms
No
Check sleep clock (C150 end towards D300 or probe test point J301) 32kHz square wave
No
Check sleep clock circuit. R117, R118, R126, C103, C104, C150 and B100
Yes
Yes
Faulty N100 or overloaded PURX line
13MHz clock R835 (end away from D350) 500mVpp min.
Yes
No
13MHz clock C300 (end away from D350) 800mV min.
No
Yes
Check C760, R706, R707, V702, R717, C722, L701, G701
Check R835, C820
B

Figure 2: Fault Finding for Flash Programming Errors

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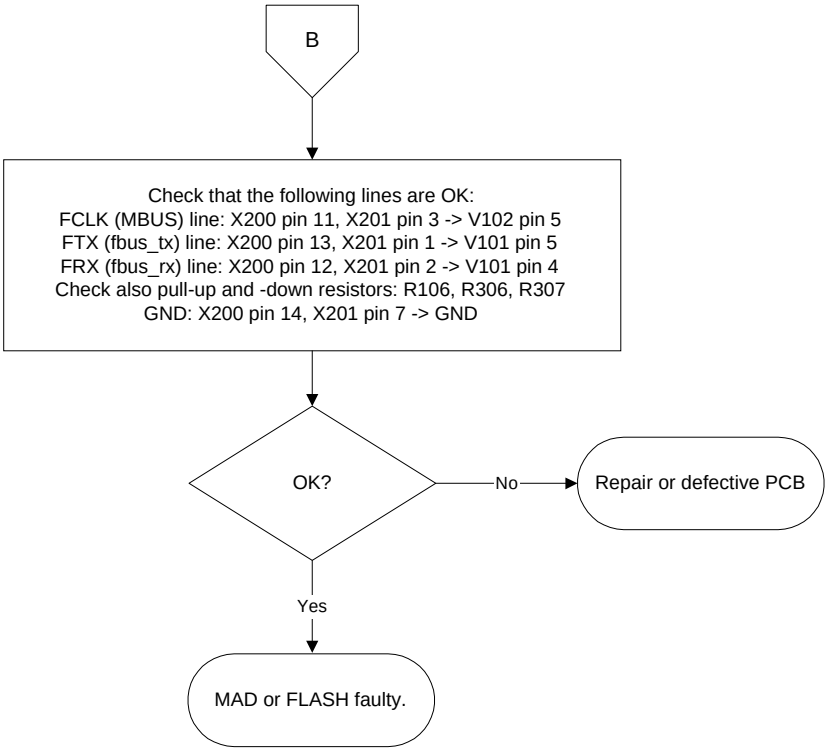
B
Check that the following lines are OK:
FCLK (MBUS) line: X200 pin 11, X201 pin 3 -> V102 pin 5
FTX (fbus_tx) line: X200 pin 13, X201 pin 1 -> V101 pin 5
FRX (fbus_rx) line: X200 pin 12, X201 pin 2 -> V101 pin 4
Check also pull-up and -down resistors: R106, R306, R307
GND: X200 pin 14, X201 pin 7 -> GND
OK?
No
Repair or defective PCB
Yes
MAD or FLASH faulty.

Figure 3: Fault Finding for Flash Programming Errors (Cont'd)

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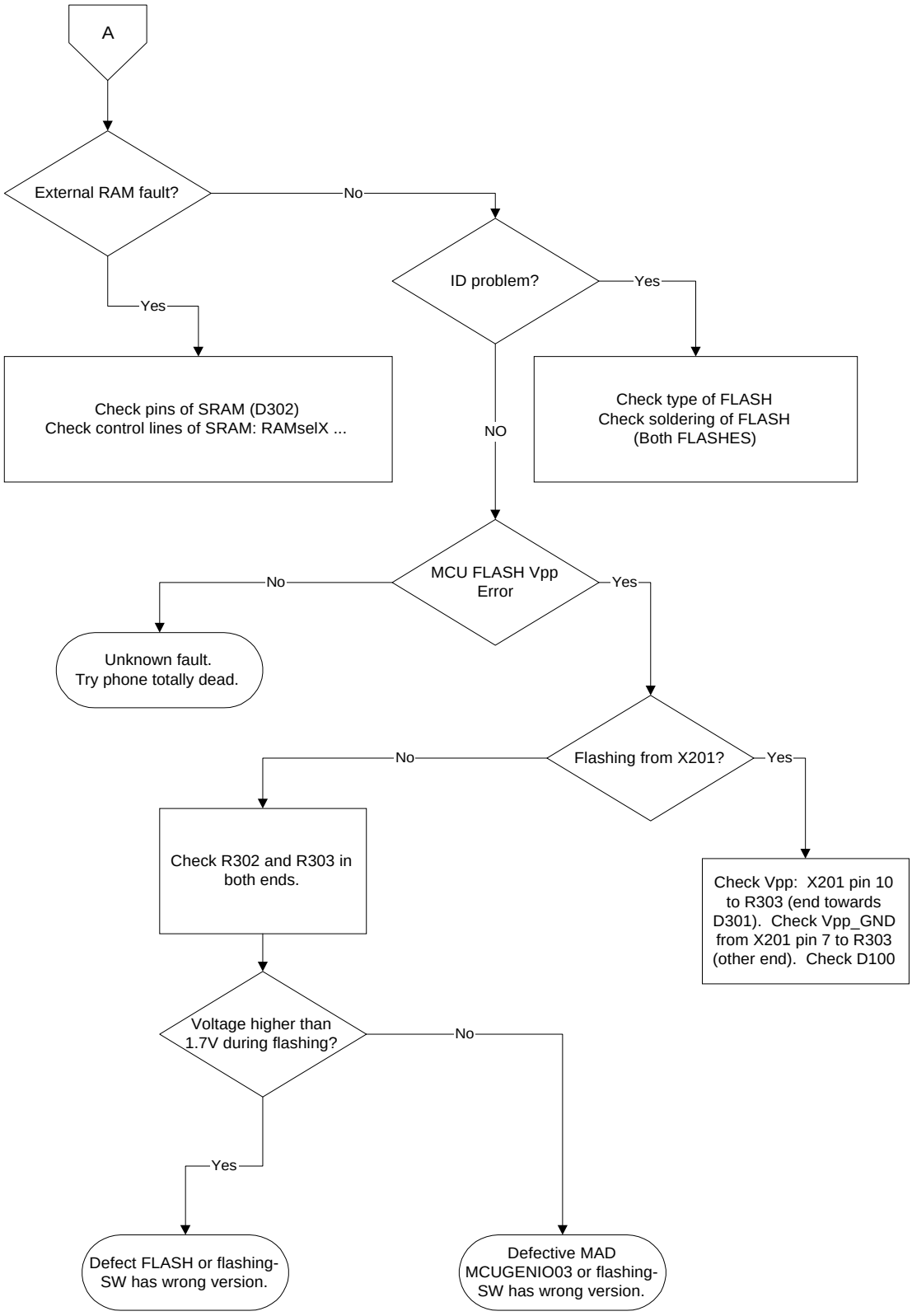

Figure 4: Fault Finding for Flash Programming Errors (Cont'd)

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Power Doesn't Stay on or Phone is Jammed

If this kind of fault occurs after flash programming, there may be open pins on ICs or other discrete components. Solder joints on discrete capacitors and resistors and open joints on components with pins, such as D302 (SRAM), should be checked first. The soldered joints of ICs D300 (MAD2WD1), D301 and D303 (FLASH), N200 (COBBA_GJP), and N100 (CCONT) are difficult to visually inspect since these components are CSP or uBGA style packages.

A quick and easy way to test the solder joints on CSPs is to apply a small amount of pressure to the top of the package while powering-up the phone. If the phone powers-up while applying pressure to a specific component (e.g., MAD), then it can be assumed that that component has faulty solder joints.

Normally, the power will be switched off by CCONT (N100) after 30 seconds if the watchdog of the CCONT cannot be served by software. In order to verify if watchdog is updated, verify that X400 pin-2 is high and at the same time X400 pin-13 toggles. In normal cases, there is a short burst of pulses every 8 seconds.

The power-off function of CCONT can be prevented by connecting a short circuit wire from R413 (end towards N100) to ground.

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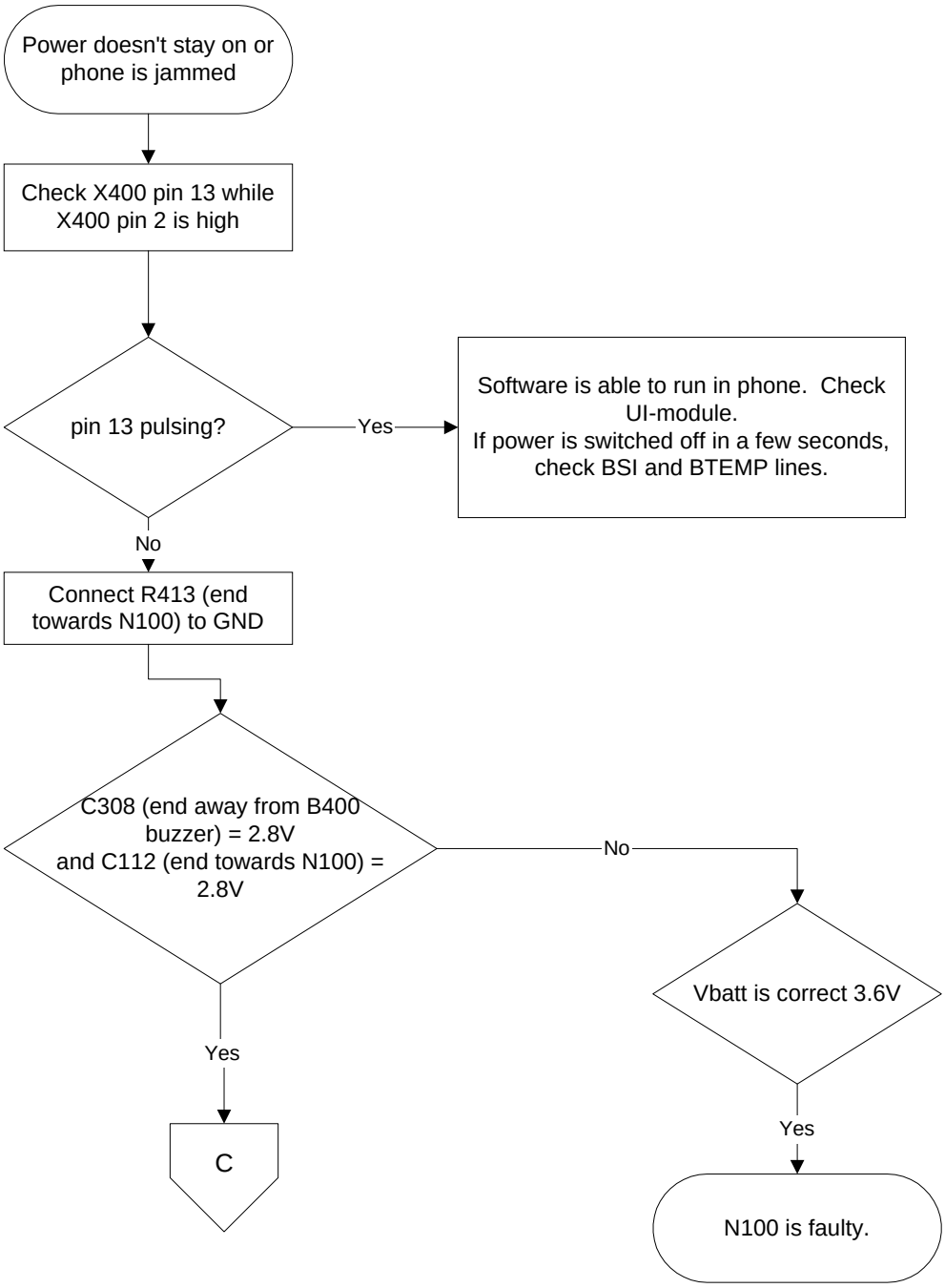
Power doesn't stay on or phone is jammed
Check X400 pin 13 while X400 pin 2 is high
pin 13 pulsing?
Yes
Software is able to run in phone. Check UI-module.
If power is switched off in a few seconds, check BSI and BTEMP lines.
No
Connect R413 (end towards N100) to GND
C308 (end away from B400 buzzer) = 2.8V and C112 (end towards N100) = 2.8V
No
Vbatt is correct 3.6V
Yes
C
Yes
N100 is faulty.

Figure 5: Power Won't Stay on or Jammed Phone

The label "C" refers to Figure 2.

Display Information: Contact Service

This fault means that software is able to run and thus, the watchdog of CCONT (N100) can be served.

Self-test functions are run when power is switched on and software has started to execute from flash. If any of the self-tests fail, contact service information will be shown on

the display. This may indicate open solder joints on components, faulty PCB, or other damage to the phone has occurred.

"Contact Service" may also indicate that the flash software has become corrupted. The phone may then require either a simple re-flash or, in some cases, a total erase and re-flash.

Phone Doesn't Register to the Network or Phone Doesn't Make a Call

If the phone doesn't register to the network or the phone doesn't make a call, the reason could be either a baseband or RF part.

Wintesla service software can be used to set the required mode and determine if the fault is in the RF or baseband sections (RF interface measurements).

The control lines for the RF section supply both the System ASIC (MAD2;D300) and the RFI (Cobba_GJP; N200). MAD2WD1 handles digital control lines (synthena, TxP, etc.) and Cobba handles analog control lines (AFC, TxC, etc.)

The DSP software is constructed so that operation states of DSP (MAD2WD1) can be seen in external flag (DSPXF) output pin J314.

After power-up, DSP signals all completed functions by changing the state of the XF pin (see Figure 6, Figure 7, Figure 8, and Figure 9).

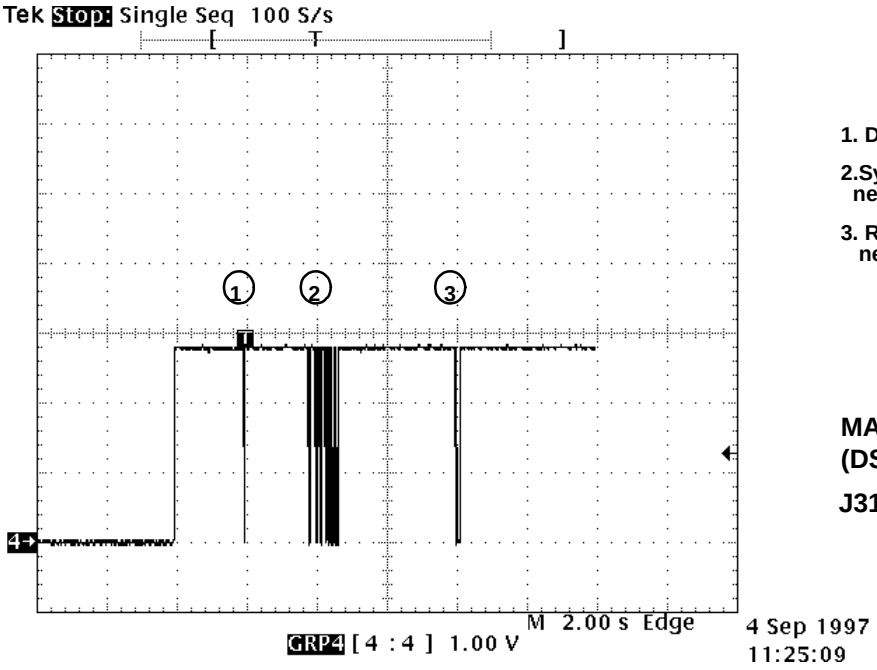

Figure 6: The states of DSP (MAD2) after power on

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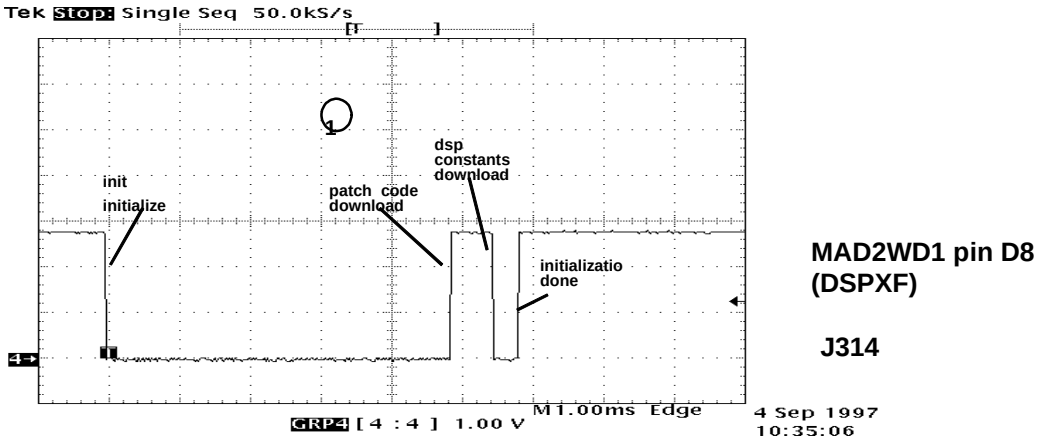

Figure 7: The states of DSP after power on

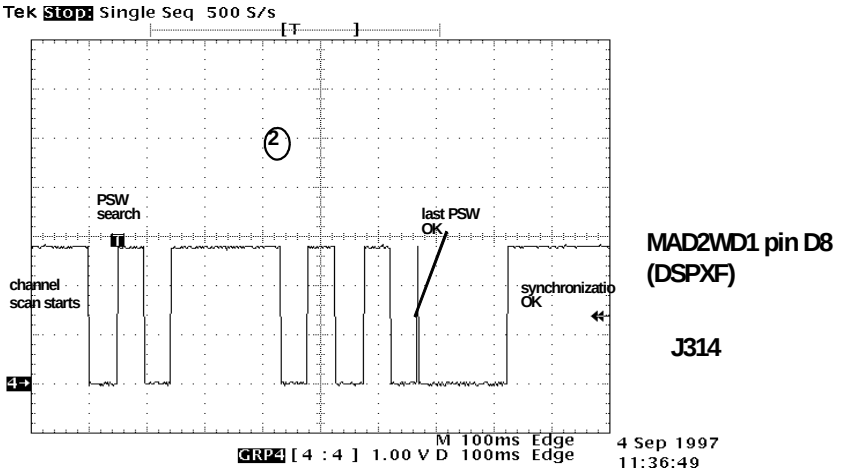

Figure 8: The states of DSP after power on

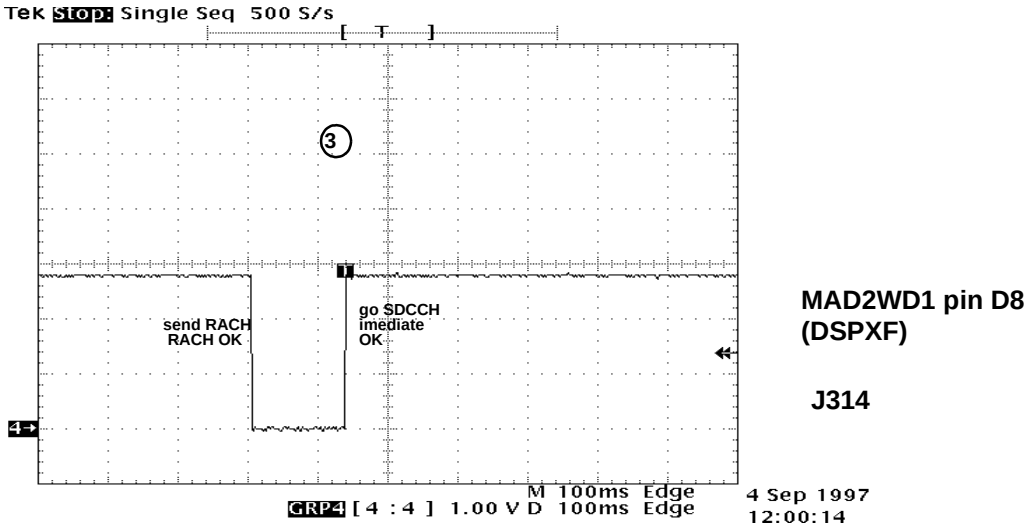

Figure 9: The states of DSP after power on

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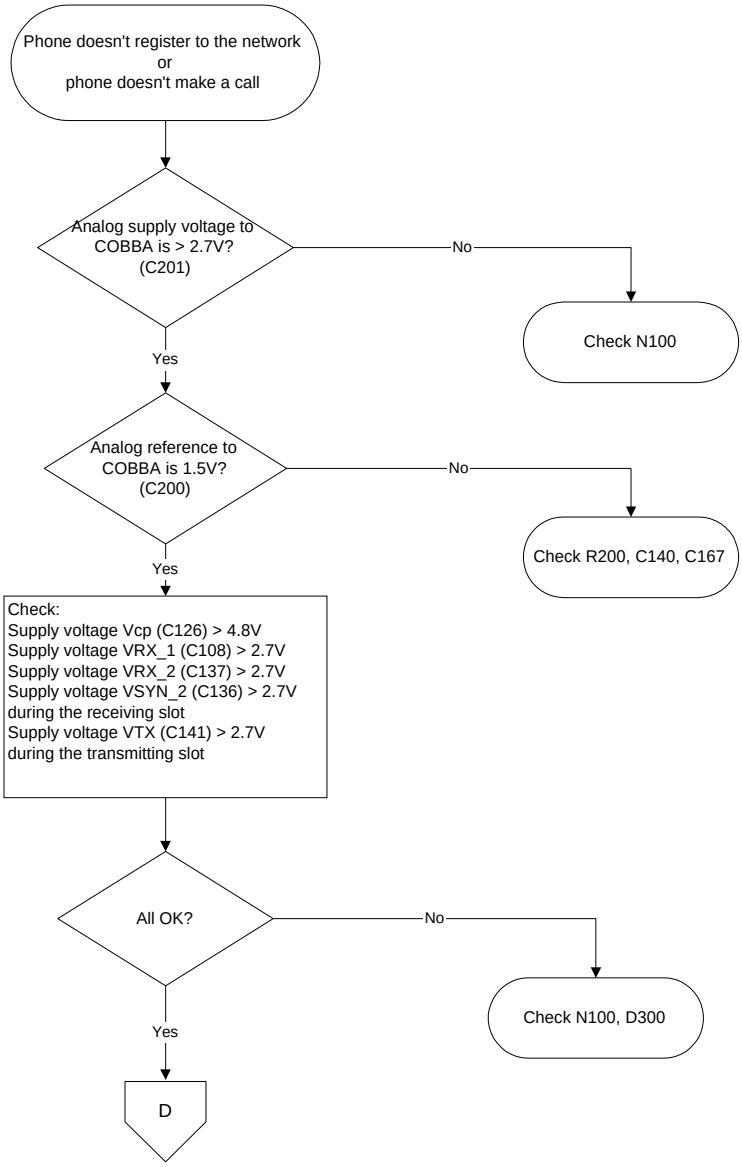

Figure 10: Fault Finding for Network Registration or Call Problems

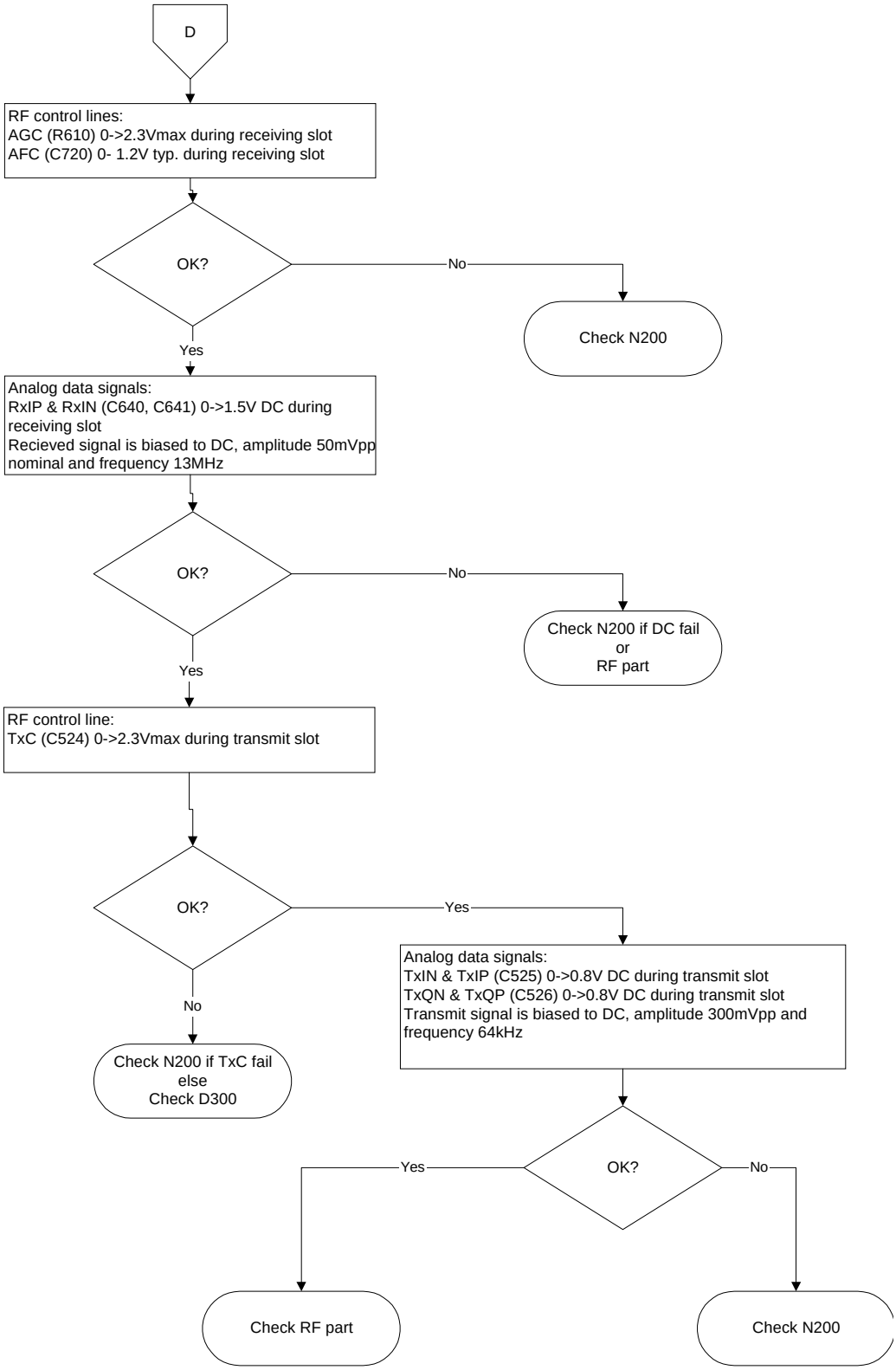

Figure 11: Fault Finding for Network Registration or Call Problems (Cont'd)

SIM Card is Out of Order

The hardware for the SIM interface from MAD2WD1 (D300) to the SIM connector (X100) can be tested without a SIM card.

When the power is switched on and if the BSI line (X102;1) is grounded by a resistor, all of the used lines (VSIM, RST, CLK, DATA) rise up to 5V four times. Thus, “Insert SIM card” faults can be found without a SIM card.

The fault information “Card rejected” means that the ATR message (the first message is always sent from card to phone) is sent from the card to the phone, but the message is somehow corrupted, data signal levels are wrong, etc., or factory set values stored to the EEPROM are not correct.

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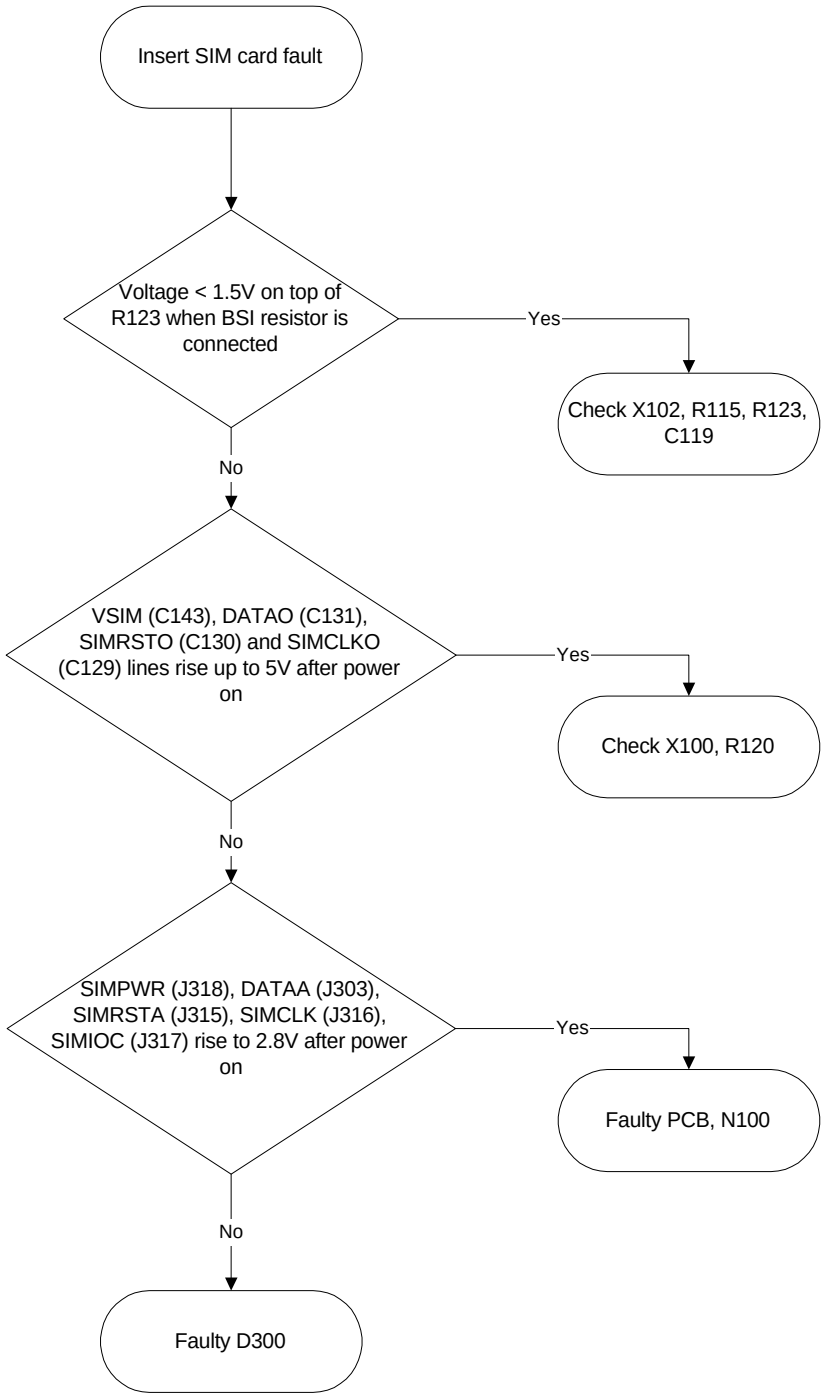
Insert SIM card fault
Voltage < 1.5V on top of R123 when BSI resistor is connected
Yes
Check X102, R115, R123, C119
No
VSIM (C143), DATAO (C131), SIMRSTO (C130) and SIMCLKO (C129) lines rise up to 5V after power on
Yes
Check X100, R120
No
SIMPWR (J318), DATAA (J303), SIMRSTA (J315), SIMCLK (J316), SIMIOC (J317) rise to 2.8V after power on
Yes
Faulty PCB, N100
No
Faulty D300

Figure 12: Fault Finding for "Insert SIM Card" Error

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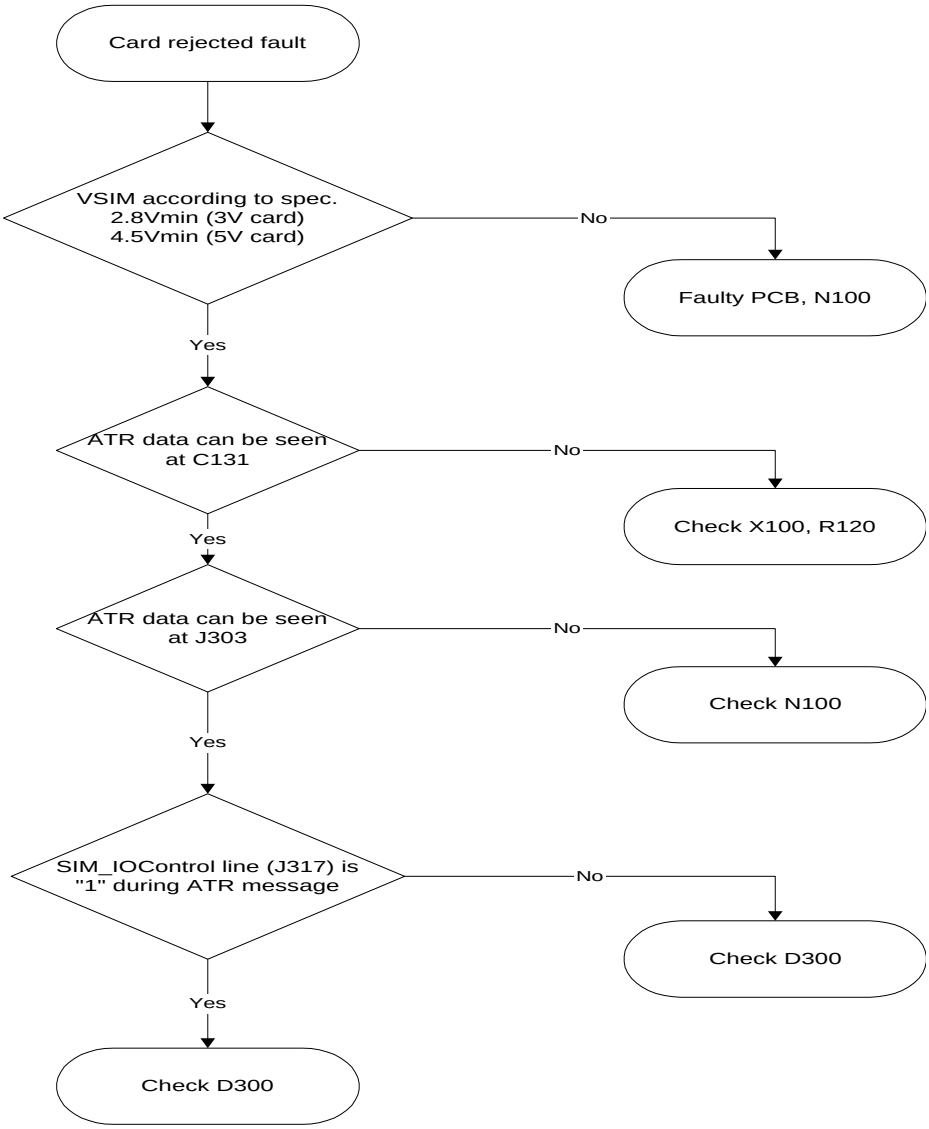

Figure 13: Fault Finding for Rejected SIM Card

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Audio failure: Uplink (microphone) and downlink (earphone) are broken

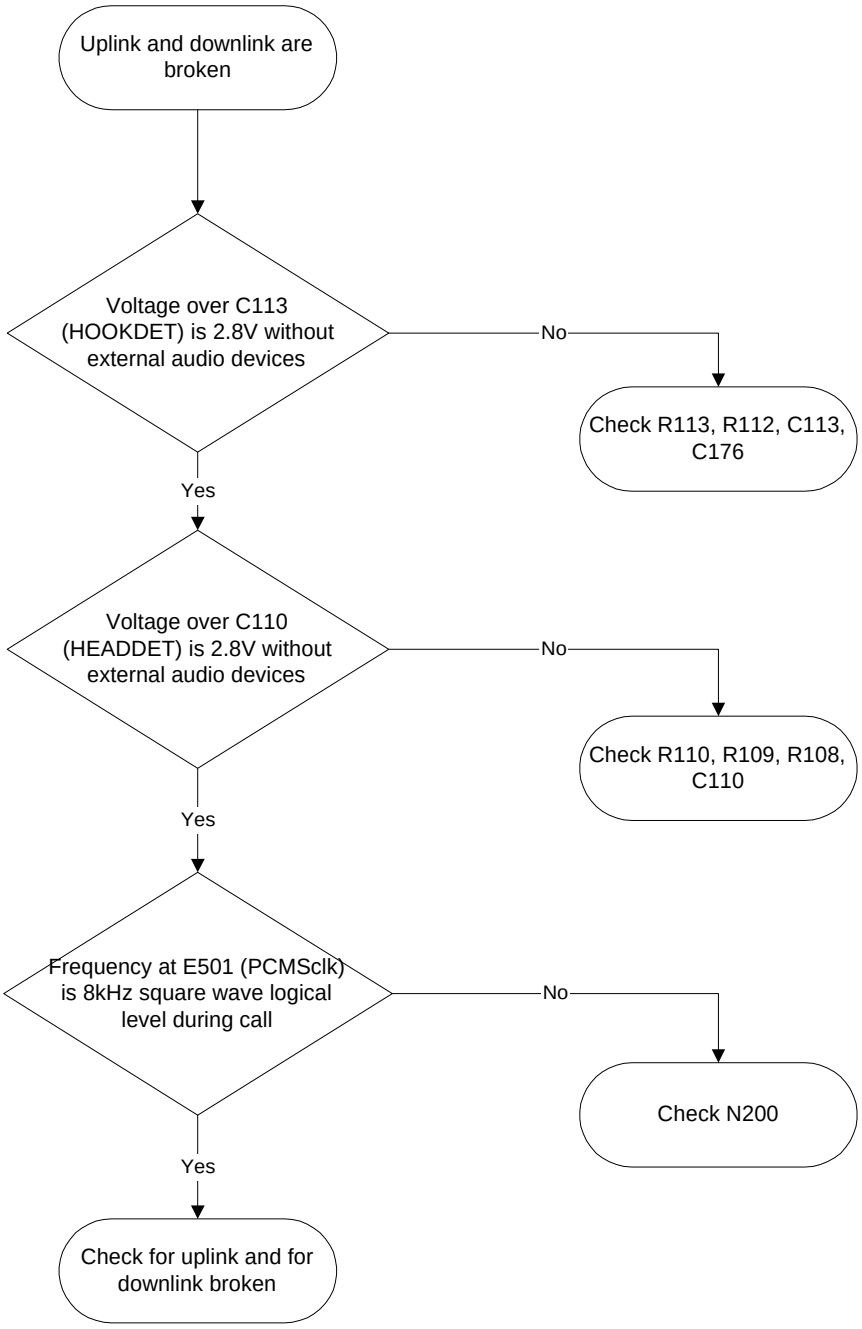
Uplink and downlink are broken
Voltage over C113 (HOOKDET) is 2.8V without external audio devices
No
Check R113, R112, C113, C176
Yes
Voltage over C110 (HEADDET) is 2.8V without external audio devices
No
Check R110, R109, R108, C110
Yes
Frequency at E501 (PCMSclk) is 8kHz square wave logical level during call
No
Check N200
Yes
Check for uplink and for downlink broken

Figure 14: Fault Finding for Broken Uplink and Downlink Audio

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Audio failure: Uplink (microphone) is broken

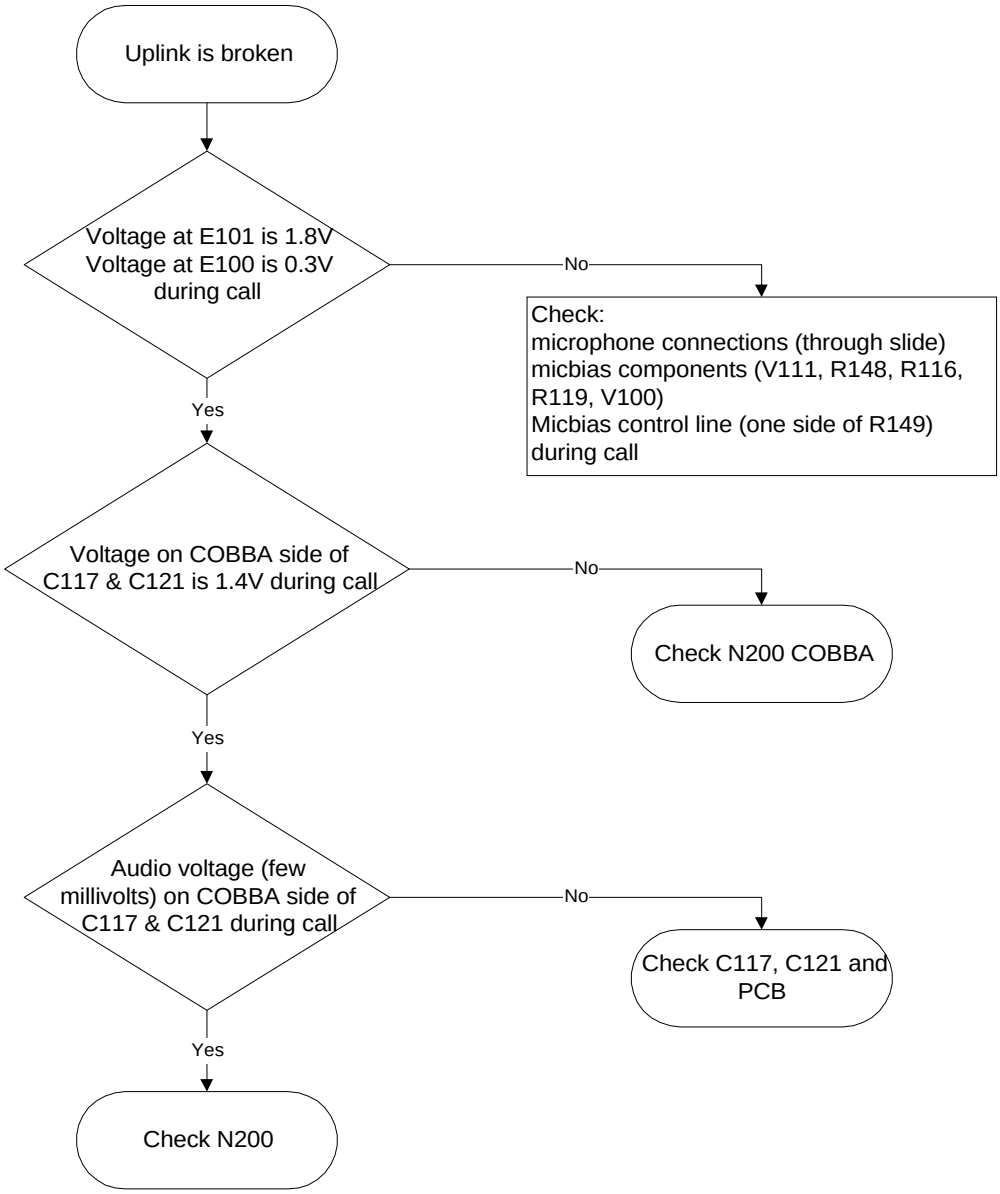

Figure 15: Fault Finding for Broken Uplink Audio with Working Downlink

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Audio failure: Downlink (earphone) is broken

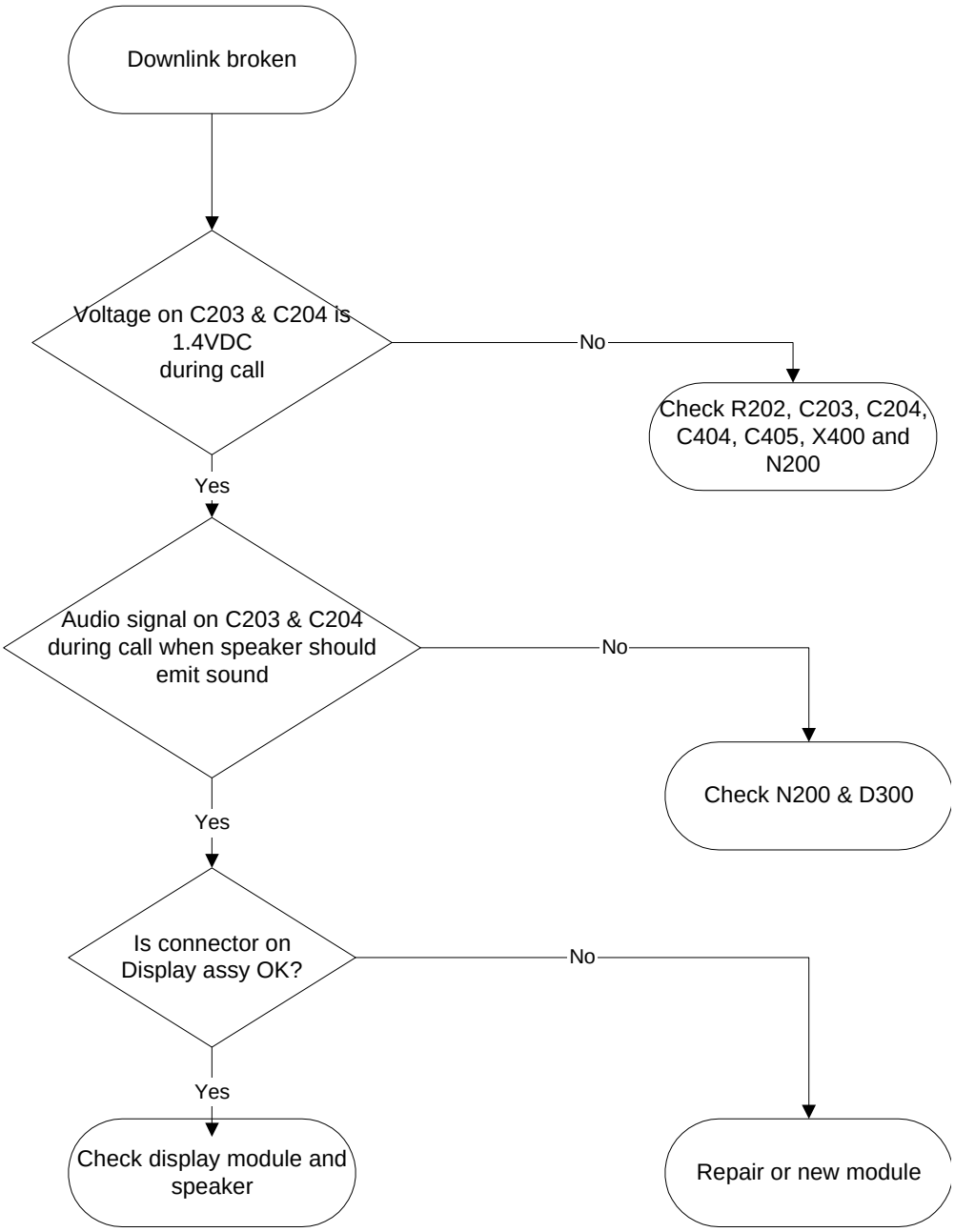
Downlink broken
Voltage on C203 & C204 is 1.4VDC during call
No
Check R202, C203, C204, C404, C405, X400 and N200
Yes
Audio signal on C203 & C204 during call when speaker should emit sound
No
Check N200 & D300
Yes
Is connector on Display assy OK?
No
Yes
Check display module and speaker
Repair or new module

Figure 16: Fault Finding for Broken Downlink with Working Uplink

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Charger Failure

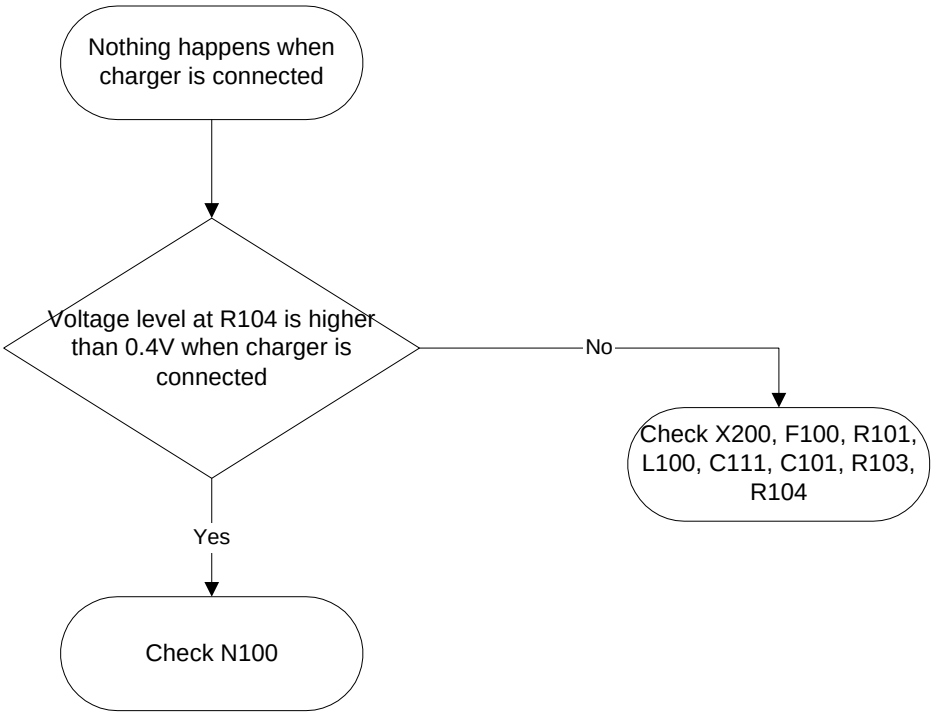
Nothing happens when charger is connected
Voltage level at R104 is higher than 0.4V when charger is connected
No
Check X200, F100, R101, L100, C111, C101, R103, R104
Yes
Check N100

Figure 17: Fault Finding for Charger Failure

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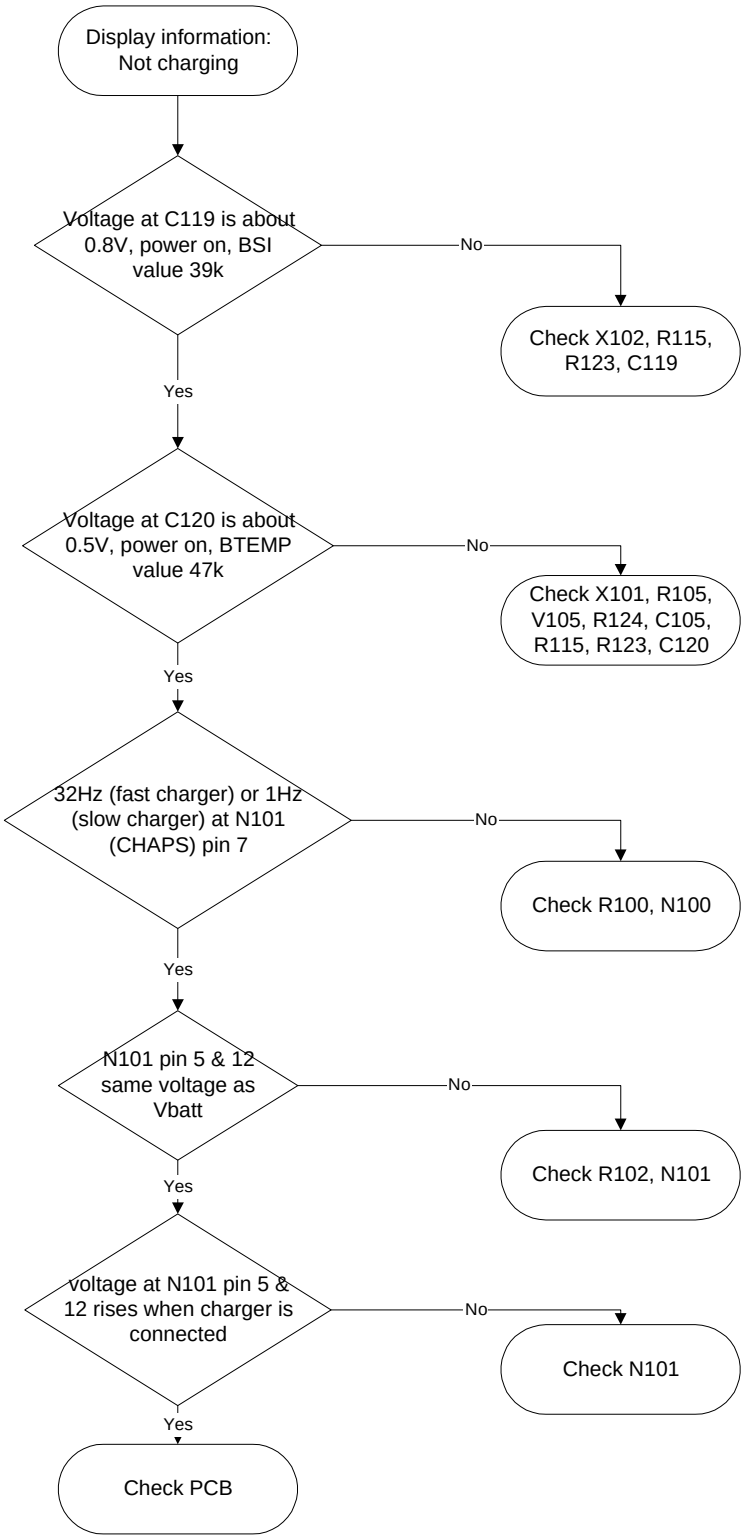
Display information: Not charging
Voltage at C119 is about 0.8V, power on, BSI value 39k
No
Check X102, R115, R123, C119
Yes
Voltage at C120 is about 0.5V, power on, BTEMP value 47k
No
Check X101, R105, V105, R124, C105, R115, R123, C120
Yes
32Hz (fast charger) or 1Hz (slow charger) at N101 (CHAPS) pin 7
No
Check R100, N100
Yes
N101 pin 5 & 12 same voltage as Vbatt
No
Check R102, N101
Yes
voltage at N101 pin 5 & 12 rises when charger is connected
No
Check N101
Yes
Check PCB

Figure 18: Fault Finding for Charger Failure (Cont'd)

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